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**INT CL<sup>4</sup> A47D, B60N**

(54) **Improvements in or relating to a convertible seat for a vehicle**

(57) A convertible seat for a vehicle, convertible between a condition in which the seat may be used by an adult and a condition in which the seat may be used by a child, the seat comprising a back assembly and a main seat squab, the back assembly incorporating a cover movable from a position in which the cover forms part of the back of the seat to a position in which the cover exposes a recess formed in the back of the seat behind the cover, the recess containing a further squab, this squab being movable from an initial stored position to an exposed position, the cover then being movable to a position in which the cover forms a back for a seat defined by the child seat squab.

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Fig. 1.

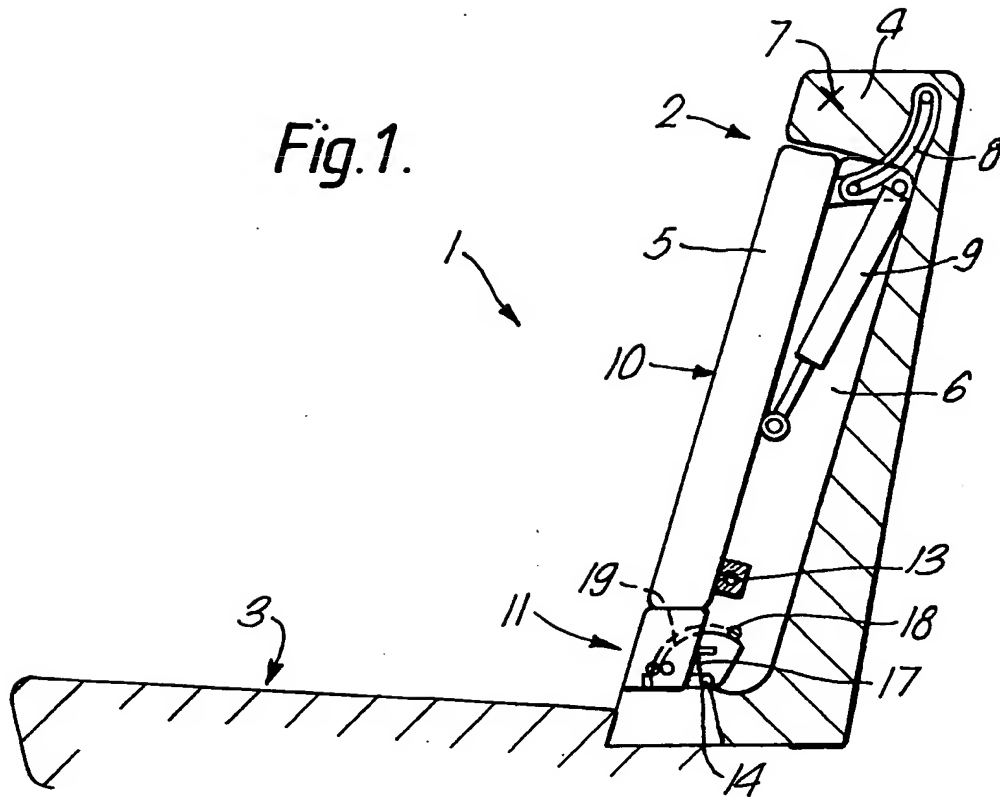


Fig. 2.

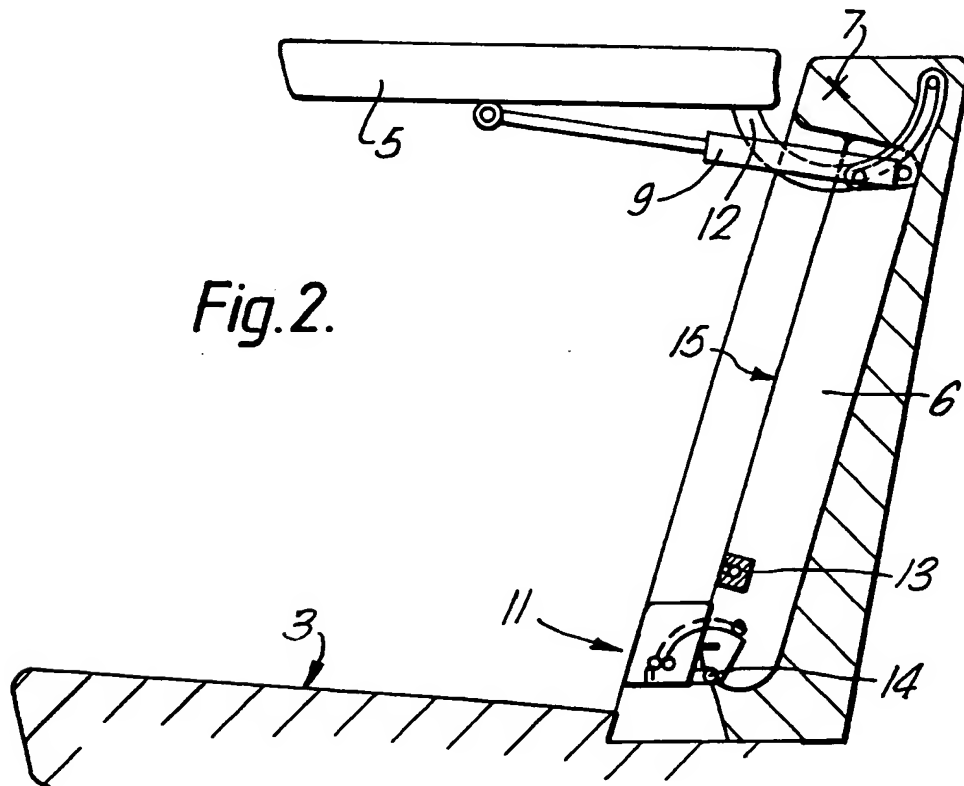


Fig.3.

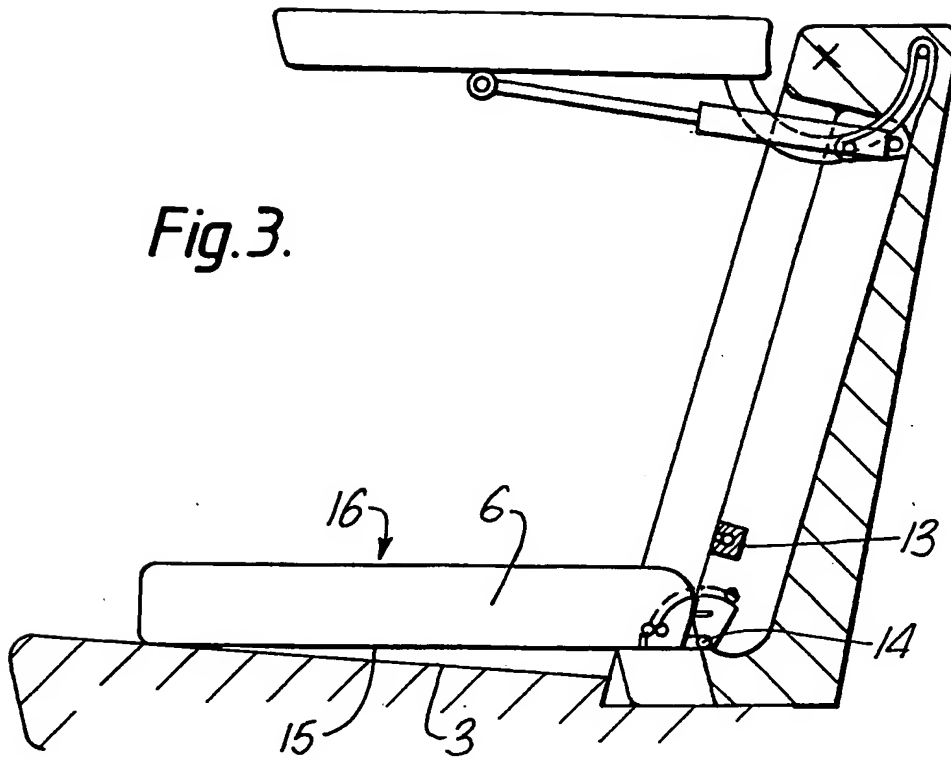


Fig.4.

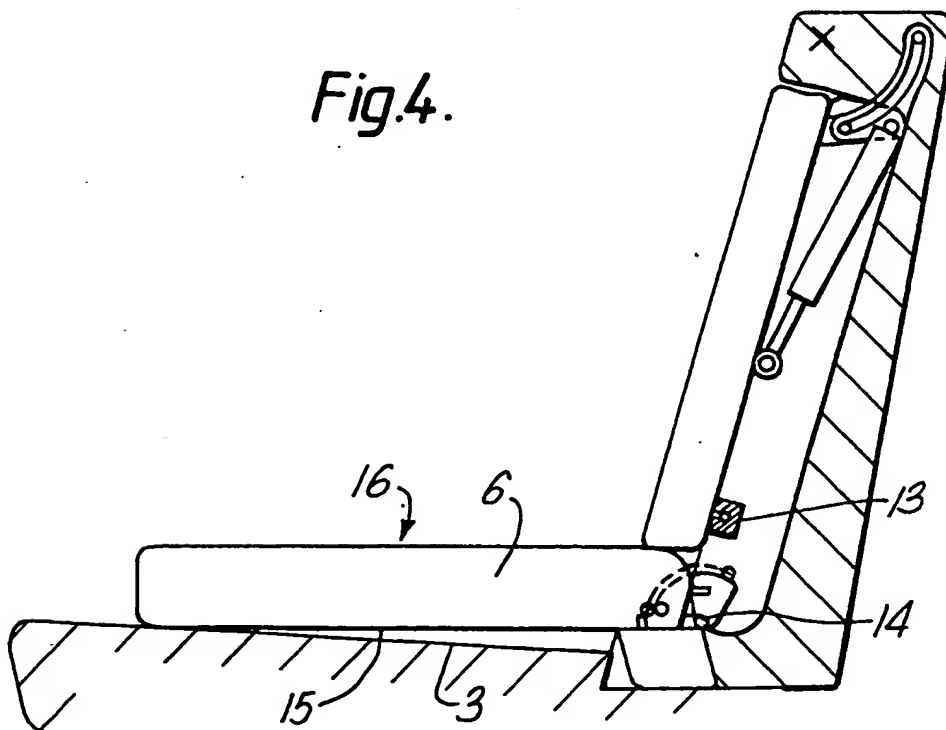


Fig. 5.

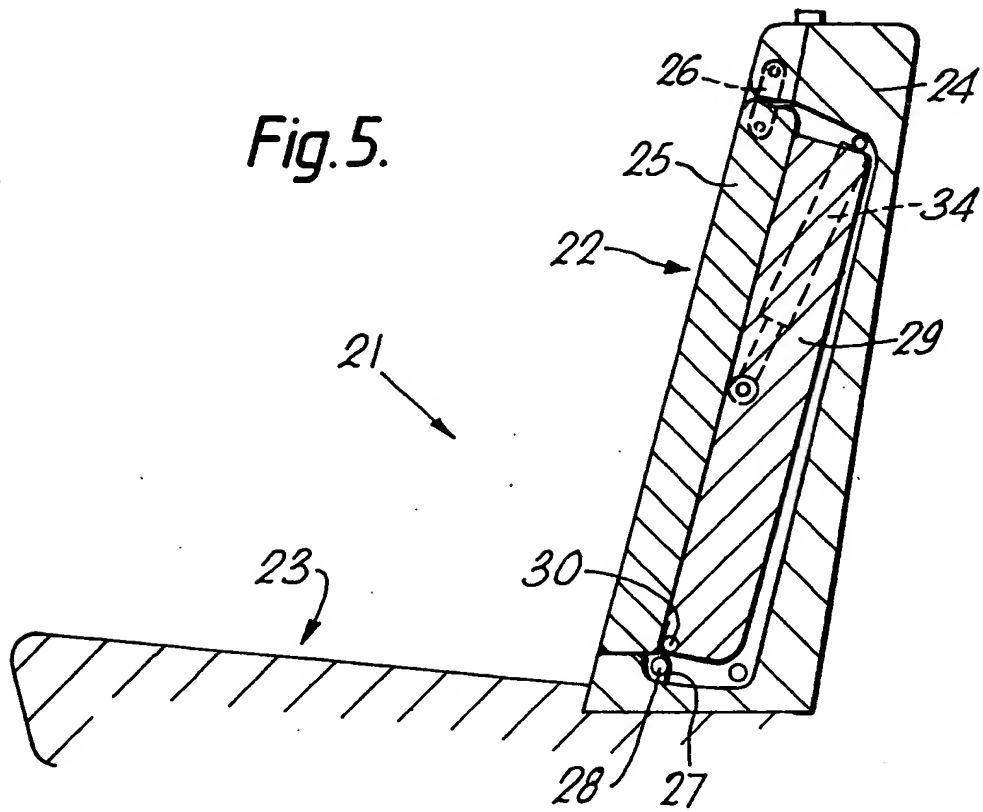


Fig. 6.

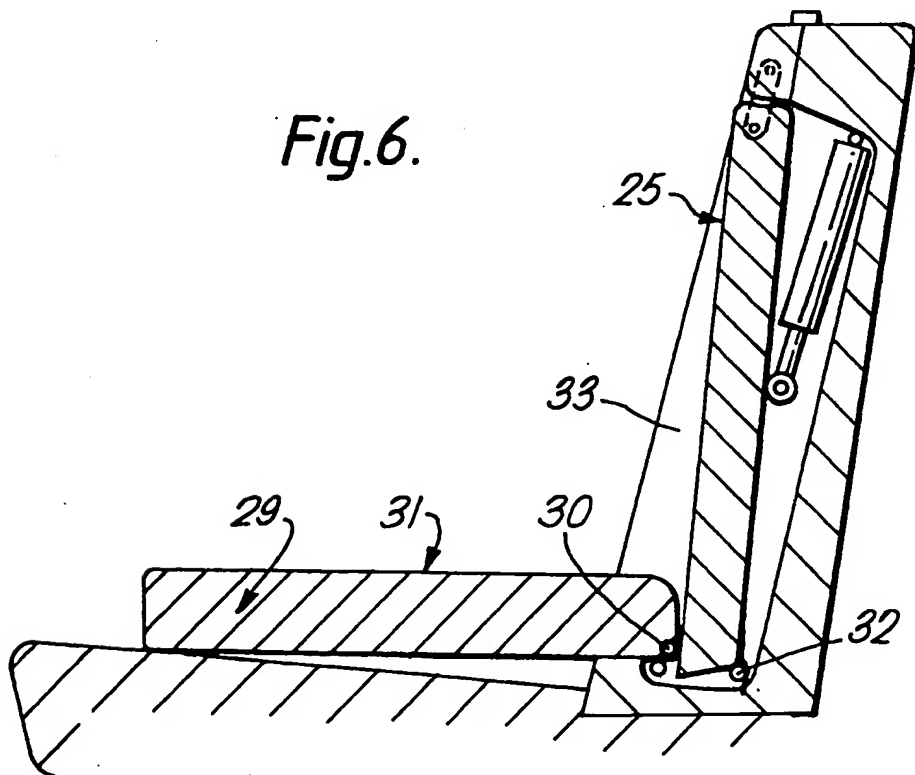


Fig. 7.

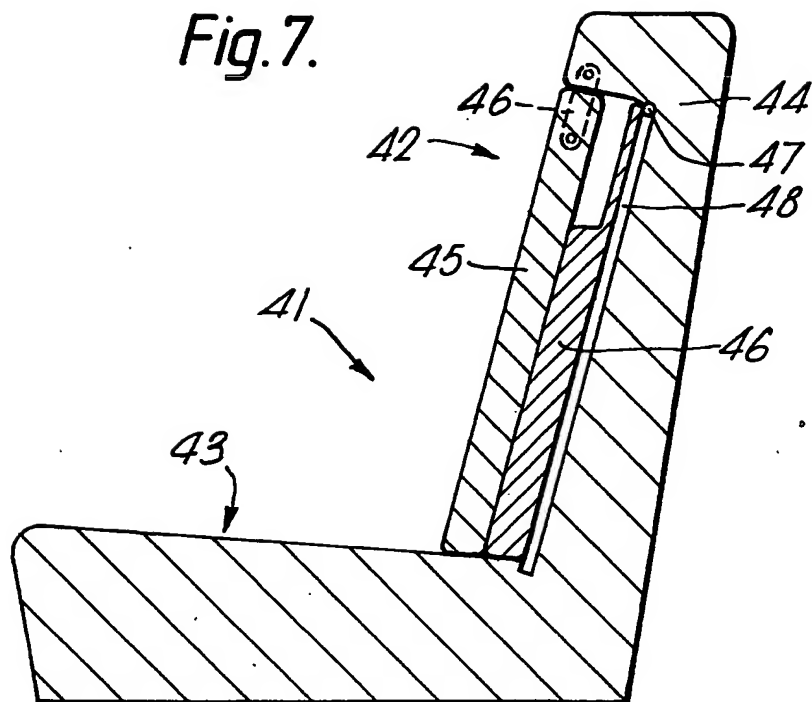
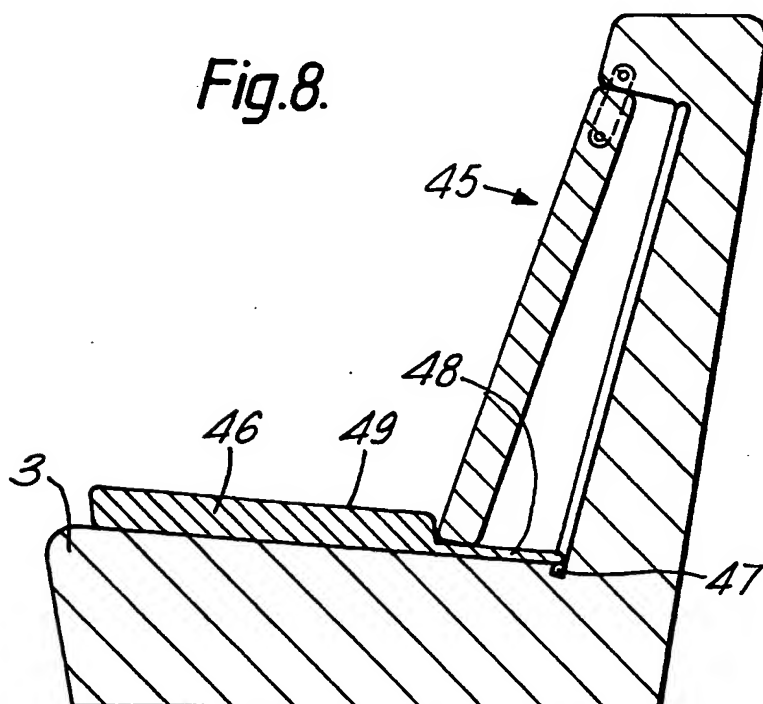


Fig. 8.



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**DESCRIPTION OF INVENTION**

Improvements in or relating to a convertible seat for a vehicle.

THE PRESENT INVENTION relates to a convertible seat for a vehicle and more particularly relates to a convertible seat adapted to be converted from a first condition in which the seat is suitable for use by an adult, to a second condition in which the seat is suitable for use by a small child.

It has been proposed previously to provide a convertible seat for use by a child within a motor vehicle. Reference may be made to U.S.A. Patent Specification 4540216 which discloses a seat which, in an initial condition, resembles a normal seat. However, part of the back of the seat is hinged and can be folded downwardly, thus placing in an operative position a seat squab adapted to be occupied by a relatively small child. Similarly, European Patent Publication 0258194 discloses a seat which initially resembles an adult seat. The seat has an arm-rest which can be pulled down to an operative position. However, when the arm-rest is in the operative position the upper part of the arm-rest may be moved upwardly relative to the rest of the arm-rest, thus exposing a child seat which is initially contained totally within the arm-rest.

It is to be appreciated that in both the prior

art arrangements disclosed above the exposed surfaces of the seat, when in both the operative conditions, must comprise a padded or resilient layer, so that the seat will be comfortable when sat upon by an adult and so that the seat will be comfortable when sat upon by a child. Thus separate padding or resilient layers are provided on those parts of the seat which are exposed in both operative conditions of the seat. The resilient layer or padding should be designed to provide an adequate degree of comfort, and may also be provided with a fairly expensive outer surface, such as velvet or leather. Thus the prior proposed arrangements may have to be relatively bulky, to accommodate sufficient padding, and also relatively expensive, by virtue of the substantial layer of surface material required.

The present invention seeks to provide an improved convertible seat in which the above-mentioned disadvantages are obviated or reduced.

According to this invention there is provided a convertible seat for a vehicle, convertible between a condition in which the seat may be used by an adult and a condition in which the seat may be used by a child, the seat comprising a back assembly and a main seat squab, the back assembly incorporating a cover movable from a position in which the cover forms part of the back of the seat to a position in which the cover exposes a recess formed in the back of the seat behind the cover, the recess containing a further squab, this squab being movable from an initial stored position to an exposed position, the cover then being movable to a position in which the cover forms a back for a seat defined by the child seat squab.

Preferably the cover is pivotally connected to the rest of the back of the seat.

Alternatively the cover is connected to the rest of the back of the seat by means of links.

Conveniently the child squab is pivotally connected to the back of the seat.

Alternatively the child squab has means thereon engaging a rail to permit the child squab to move from an initial position within the cavity to the exposed condition, with said means sliding along the rail.

Preferably when the cover is in the position to form the back to the seat defined by the child squab, the cover is partially recessed within the cavity, so that side walls of the cavity can provide lateral support for a child sitting on the seat.

Advantageously the child squab is provided with a layer of padding or resilient material which is thinner than or less resilient than a layer of padding or resilient material provided on the main squab.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which

FIGURE 1 is a diagrammatic sectional side elevational view of a vehicle seat in accordance with one embodiment of the invention with the various components thereof in a first condition,

FIGURE 2 corresponds to Figure 1 but showing the components in a second condition,

FIGURE 3 corresponds to Figure 2, but shows the



components in a further condition,

FIGURE 4 corresponds to Figure 3 showing the components in yet another condition,

FIGURE 5 is a corresponding diagrammatic side elevational sectional view of a second embodiment of a convertible seat in accordance with the invention,

FIGURE 6 is a view corresponding to Figure 5 showing the seat illustrated therein in a second condition,

FIGURE 7 is a further diagrammatic side elevational vertical sectional view of a further seat in accordance with the invention, and

FIGURE 8 is a view corresponding to Figure 7 showing the seat illustrated therein in an alternative condition.

Referring initially to Figures 1 to 4 of the accompanying drawings a car seat 1 presents a back assembly 2 and a squab 3. The squab is of conventional design. The squab is covered with an appropriate covering, and is provided with a layer of padding, such as a resilient layer.

The back assembly 2 of the seat comprises a fixed rear portion 4 which is fixed in position. Movably connected to the rear portion 4 are a cover 5 and a child seat squab 6. The cover 5 is mounted for movement about a pivot axis 7. The cover is located so that in an initial condition it covers a recess in which the child seat squab 6 is accommodated. The cover 5 has part thereof engaging an arcuate slot 8 the centre of curvature of which is coincident with the pivot axis 7.

The cover 5 is associated with a strut 9 which may be a hydraulic strut used to cause the cover to move under power, or an air spring. The strut 9 extends between a rear part of the cover and part of the fixed rear portion 4.

The cover 5 is initially in a position in which the cover 5 is recessed within the back 3 of the seat, so that the front face of the cover is substantially flush with the rest of the back 3 of the seat. The exposed face 10 of the cover 5 is covered with an appropriate material, such as velvet or leather, and immediately under the exposed surface 10 is a layer of padding or some other resilient layer.

It will be appreciated that when the cover is in the position as illustrated in Figure 1, the seat may be used by an adult in the normal way. The posterior of the adult will rest upon the seat squab 3 and the dorsal region of the adult will rest against the exposed surface 10 of the cover 5. A padded element 11 may be contacted by the lower spine, this padded element 11 being secured to the child seat squab 6 which will be described in detail hereinafter. The padded element 11 is located just below the lower edge of the cover 5, and extends to the level of the seat squab 3.

The cover 5 is connected to the arcuate slot 8 by means of a shoe carried on an arcuate arm 12 seen more clearly in Figure 2 which illustrates the cover 5 in an extended position. The shoe can slide along the slot 8. It can be seen that the cover 5 has effectively pivoted from the position illustrated in Figure 1 to the position illustrated in Figure 2 about the pivot axis 7. The strut 9 has been significantly extended.

A catch 13 may be provided on the side of the

recess covered by the cover 5, to lie adjacent the rear face of the cover 5, to engage means on the rear face of the cover 5 to hold the cover 5 in the initial position as illustrated in Figure 1.

The child seat squab 6 is pivotally mounted for movement about a pivotal axis 14. The squab presents a first face 15, which may be substantially rigid, which initially lies adjacent the rear face of the cover 5. The squab also presents the forwardly extending projection 11, the front face of which is padded.

When the cover 5 has been lifted to the elevated position as illustrated in Figure 2 the child seat squab may be pivotted about the axis 14, so that the squab is substantially horizontal and the face 15 comes into contact with the adult seat squab 3. However, the child seat squab may only have a limited degree of pivotal movement and may thus not come into contact with the adult seat squab 3.

A face 16 of the child's seat squab 6 is then exposed, this being a face which is initially concealed. The face 16 may be covered with an appropriate covering and will be provided with a padded or resilient layer. However, the padded or resilient layer will not be as thick as, or as resilient as the padded or resilient layer provided in the adult seat squab 3.

The pivot axis 14 is engaged by a leaf spring 17 which serves to bias the axis 14 into a recess formed in the squab 6. A projecting pin 18 formed on the seat rides over a guiding or cam surface 19 which is fixed in position. The cam surface presents an arcuate outer face against which the projection 18 abuts. However, this arcuate face has a centre of curvature which is off-set from the ordinary position of the pivot axis 14.

Thus, as the child's seat squab 6 is pivoted downwardly, the pivot axis 14 is moved forwardly against the bias of the spring 17. However, when the seat is in a substantially horizontal position the projection 18 may be drawn back into a recess formed at the end of the cam face 19, by the effect of the spring 17, thus securing the child squab in the lower position. When the child squab is again to be raised, the squab is moved forwardly slightly to disengage the projection 18 from the recess, and then the seat may be moved pivotally upwardly.

As can be seen from Figure 4, when the child seat squab 16 has been moved to the position as illustrated in Figure 3, the cover 5 may be returned to its initial position. The catch 13 will be engaged to retain the seat back in position. A child's safety seat is then exposed ready for use.

Of course, an appropriate seat-belt or harness would be provided for use by a child sitting on the child seat.

It is to be noted that it is not appropriate for a child to sit on a seat squab intended for an adult since, in the case of an accident arising, the padding or resilient layer may be compressed to such a degree that the child may slip under the safety-belt or harness with a "submarining" effect. This is clearly disadvantageous. Consequently the child's seat squab 6 has a lesser thickness of padding or less resilience to the padding, so that, although the seat is comfortable for the child to sit on, the seat cannot be compressed sufficiently to permit the child to "submarine" under the safety-belt or harness associated with the child seat.

It is to be appreciated that the seat may be

returned to its initial condition merely by reversing the various steps illustrated in Figures 1 to 4.

Figure 5 illustrates a second embodiment of the invention. In this embodiment of the invention a seat 21 presents a back assembly 22 and a squab 23 which is conventional design. The back assembly 22 comprises a rigid portion 24 which remains in position and a cover 25 which is movably mounted on the fixed portion 24 by means of links 26 which are pivotally connected both to the back and to the cover 25. The lower end of the cover 25 is provided at its rear face with a projecting finger or tab 27 adapted to engage a stop 28. It will thus be appreciated that the cover may initially be in the position as illustrated in Figure 5, but may then be moved firstly by moving the top of the cover forwardly and then by moving the top of the cover upwardly, disengaging the tab 27 from the stop 28, and enabling the cover 25 to be moved to a substantially horizontal position.

The child squab 29 is mounted within a cavity in the seat back which is initially closed by the cover 25. The squab 29 is mounted for movement about a pivot axis 30 adjacent the lower end of the squab, which initially has a substantially vertical position. It is to be appreciated that once the cover has been moved away from the position illustrated in Figure 5, the child squab 29 may be pivoted outwardly and downwardly to the position illustrated in Figure 6. A surface 31 of the squab is then exposed, which was initially concealed, this surface having been covered with an appropriate covering material and having an appropriate padded or resilient layer. The cover 25 may then be moved to the position illustrated in Figure 3, again by manipulating the cover so that the tab 27 provided at the lower end of the cover engages a second stop 32

which is located rearwardly of the first stop. Consequently the cover does not return to its initial position but is located in a second position. It can be seen that in this second position the cover is partly recessed within the cavity formed in the back of the seat to accommodate the child squab 29, and consequently, at the side edges of the cavity, regions of the ordinary seat back project forwardly of the cover 25, thus providing vertical faces which provide a child sitting on the seat squab 31 with a degree of lateral support.

It is to be appreciated that in the embodiment of Figures 5 and 6 the cover 25 will be provided with an appropriate covering and with an appropriate padding or resilient layer, and this covering is exposed in both conditions of the seat as illustrated, and also the padding or resilient layer is utilised both by an adult using the seat and by a child using the seat.

A strust 34 is associated with the cover 25.

Figures 7 and 8 illustrate another embodiment of the invention in which a seat 41 presents a back assembly 42 and a squab 43. The squab 43 is of conventional design. The back assembly 42 comprises a fixed part 44 to which a cover 45 is connected by means of a hinged link 46 which is pivotally connected to the fixed part 44 and which is also pivotally connected to the cover 45. Within a recess defined behind the cover is a squab 46 intended for use by a child. The squab 46 has an initial position in which it is substantially vertical. At the upper region of the squab 46 projecting means 47 are provided which engage a track 48 which extends substantially vertically.

It is to be appreciated that the cover 45 may

be manipulated so that the child squab 46 is exposed. The lower end of the child squab 46 may then be pulled forwardly so that the projection 47 moves down the track 48 until the projection 47 is at the lower end of the track as illustrated in Figure 8. The child squab 46 then extends substantially horizontally and rests on the adult squab 3. The cover 45 may then be returned to its initial position. It is to be observed that the rear part of the child squab 46, that is to say the part 48 illustrated in Figure 8 is of reduced thickness to enable the cover 45 to be returned to the position illustrated in Figure 8.

As in the previous embodiments the front face of the cover will be provided with an appropriate material, such as leather or velvet, under which will be a layer of padding or some other resilient layer. The child seat squab 6 when moved to the position illustrated in Figure 8 presents a surface 49 which is provided with an appropriate covering and a padding or resilient layer of an appropriate thickness.

CLAIMS:

1. A convertible seat for a vehicle, convertible between a condition in which the seat may be used by an adult and a condition in which the seat may be used by a child, the seat comprising a back assembly and a main seat squab, the back assembly incorporating a cover movable from a position in which the cover forms part of the back of the seat to a position in which the cover exposes a recess formed in the back of the seat behind the cover, the recess containing a further squab, this squab being movable from an initial stored position to an exposed position, the cover then being movable to a position in which the cover forms a back for a seat defined by the child seat squab.

2. A seat according to Claim 1 wherein the cover is pivotally connected to the rest of the back of the seat.

3. A seat according to Claim 1 wherein the cover is connected to the rest of the back of the seat by means of links.

4. A seat according to any one of the preceding Claims wherein the child squab is pivotally connected to the back of the seat.

5. A seat according to any one of Claims 1 to 3 wherein the child squab has means thereon engaging a rail to permit the child squab to move from an initial position within the cavity to the exposed condition, with said means sliding along the rail.



6. A seat according to any one of the preceding Claims wherein when the cover is in the position to form the back to the seat defined by the child squab, the cover is partially recessed within the cavity, so that side walls of the cavity can provide lateral support for a child sitting on the seat.

7. A seat according to any one of the preceding Claims wherein the child squab is provided with a layer of padding or resilient material which is thinner than or less resilient than a layer of padding or resilient material provided on the main squab.

8. A seat substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

9. A seat substantially as herein described with reference to and as shown in Figures 5 and 6 of the accompanying drawings.

10. A seat substantially as herein described with reference to and as shown in Figure 7 and 8 of the accompanying drawings.

11. Any novel feature or combination of features disclosed herein.